## Overview The Army Civil Works Mission

From 1775 to the present, the U.S. Army Corps of Engineers has served the nation in peace and war. The Corps traces its history to June, 1775, when the Continental Congress appointed Colonel Richard Gridley as Chief Engineer of the Continental Army, under General George Washington. The original Corps was the Army's engineering and construction arm until it was mustered out of service at the close of the Revolutionary War in 1783. In 1802, recognizing a need for home-grown engineering talent for both military and civilian missions, Congress, at the urging of President Thomas Jefferson, re-established a separate Corps of Engineers within the Army. At the same time, it established the U.S. Military Academy at West Point, NY, as the country's first - and for 20 years its only - engineering school. With the Army having the nation's most readily available engineering talent, successive Congresses and administrations established a role for the Corps as an organization to carry out both military construction and works "of a civil nature." Indeed, the modern term "civil engineer" traces its origin to the eventual differentiation between the civilian and military aspects of the engineering profession. Throughout the nineteenth century, the Corps of Engineers supervised the construction of coastal fortifications, lighthouses, several early railroads, and many of the public buildings in Washington, D.C., and elsewhere. Meanwhile, the Corps of Topographical Engineers, which enjoyed a separate existence for 25 years (1838-1863), mapped much of the American West. In its civil role, the Corps of Engineers became increasingly involved with river and harbor improvements, carrying out its first harbor and jetty work in the first quarter of the nineteenth century. The Corps' ongoing responsibility for federal river and harbor improvements dates from 1824, when Congress passed two acts authorizing the Corps to survey roads and canals and to remove obstacles on the Ohio and Mississippi Rivers and at several coastal harbors. Over the years, the expertise gained by the Corps in navigation projects led succeeding administrations and Congresses to assign new water-related missions to the Corps in such areas as flood control, shore and hurricane protection, hydropower, recreation, water supply and quality, and wetland protection. Today's U.S. Army Corps of Engineers carries out missions in three broad areas: military construction and engineering support to military installations; reimbursable support to other federal agencies (such as the Environmental Protection Agency's "Superfund" program to clean up hazardous and toxic waste sites); and the Civil Works mission, centered around navigation, flood control and - under the Water Resources Development Acts of 1986, 1988, 1990, 1992, and 1996 - a growing role in environmental restoration.

## Organization

The Corps is commanded by the Chief of Engineers, Lieutenant General Carl A.

Strock, who holds an unusual position as an Army Staff officer as well as commander of a major Army command. Under Lt. Gen. Strock's command are nine engineer divisions, eight research laboratories, six engineer centers, and one battalion - the 249th Engineer Battalion (Prime Power). Of the nine divisions, eight are located in the US with 41 districts throughout the U.S., Asia and Europe. A 9th provisional division with four districts was activated January 25, 2004, to oversee operations in Iraq and Afghanistan. Of the 45 districts, 38 carry out civil works activities. In these districts are found more than 90 percent of the people involved in carrying out the civil works program. Reflecting the mission orientation of the Corps of Engineers to water resources, district boundaries for the Civil Works program within the continental United States generally follow watersheds and drainage basins, while those for military construction follow state or other political boundaries. The private sector is an essential element of the engineer team. The Corps employs private architectural, engineering, and construction firms for a high percentage of its design and all of its construction work. The partnership between the Corps and the private sector represents an immediate force multiplier of several hundred thousand architects, engineers, and builders, ready to support the nation in times of emergency.

## Project Authorization and Planning

Corps of Engineers Civil Works activities are normally initiated by non-federal interests, authorized by Congress, planned and designed by Corps of Engineers Districts or architect-engineer firms under contract to them, funded by a combination of federal and non-federal sources, built by construction firms operating under contract to the Corps, and operated and maintained either by the Corps or by a non-federal sponsoring agency. The Water Resources Development Act of 1986 made numerous changes in the way water resources projects are studied, evaluated and funded. The major change is that the law now specifies that non-federal interests, usually known as project sponsors, put up part of the cost for most Corps water resources projects. When local interests feel that a need exists for improved navigation, flood protection, or other water resources development, they may petition their representatives in Congress. A Congressional committee resolution or an act of Congress may then authorize the Corps of Engineers to investigate the problems and submit a report, with the Corps and the sponsor jointly funding and managing the study. Normally, the planning process for a water resource problem starts with a brief reconnaissance study to determine whether a project falls within the Corps' statutory authority and meets national priorities. Should that be the case, the Corps district where the project is located will carry out a full feasibility study to develop alternatives and select the best possible solution. This process normally includes public meetings to determine the views of local interests on the extent and type of improvements desired. The federal, state, and other agencies with interests in a

project are partners in the planning process. For inland navigation and waterway projects, which by their nature are not "local," Congress in the Water Resources Development Act of 1986 established an Inland Waterway User Board. This board, composed of transportation companies and shippers of major commodities, advises the Secretary of the Army on priorities for new navigation projects, such as locks and dams, and major rehabilitation of existing projects. These projects are funded in part from the Inland Waterway Trust Fund, which in turn is funded by waterway fuel taxes. Before making recommendations to Congress for project authorization, the Corps ensures that the proposed project's benefits will exceed costs, its engineering design is sound, the project best serves the needs of the people concerned, and that it makes wise use of natural resources and adequately protects the environment. After review and coordination with all interested federal agencies and the governors of affected states, the Chief of Engineers forwards this report and environmental impact statement to the Secretary of the Army, who obtains the views of the Office of Management and Budget before transmitting these documents to Congress. It is then up to Congress to include the project in an authorization bill. Before construction can get underway, however, both the federal government and the project sponsor must provide funds. A federal budget recommendation for a project is based on evidence of support by the state and the ability and willingness of a non-federal sponsor to provide its share of the project cost. Appropriation of money to build a project is usually included in the annual Energy and Water Development Appropriation Act, which must be passed by both Houses of the Congress and signed by the President. This act, one of 13 annual appropriation acts that fund most federal activities, provides funds for investigation and design of new projects, construction, operation and maintenance of completed projects, and specialized Corps of Engineers civil missions and general executive oversight. Funding for the program for Fiscal Year 1997, including supplemental appropriations and contributions by non-federal sponsors, totalled $4.36 billion. The Civil Works program receives no direct funding from the Defense appropriations, nor do the civilian employees employed in Civil Works activities count against Department of Defense strength ceilings.

## Navigation

Corps of Engineers involvement in navigation projects dates back to the early days of the United States, when rivers and coastal harbors were the primary paths of commerce in the new country. Without its great rivers, the vast, thickly-forested, region west of the Appalachians would have remained impenetrable to all but the most resourceful early pioneers. Consequently, western politicians such as Henry Clay agitated for federal assistance to improve rivers. At the same time, the War of 1812 showed the importance of a reliable inland navigation system to national defense. There was, however, a question as to whether transportation was, under the Constitution, a legitimate federal

activity. This question was resolved when the Supreme Court ruled that the Commerce Clause of the Constitution granted the federal government the authority, not only to regulate navigation and commerce, but also to make necessary navigation improvements. The system of harbors and waterways maintained by the Corps of Engineers remains one of the most important parts of the nation's transportation system. The Corps maintains the nation's waterways as a safe, reliable and economically efficient navigation system. The 12,000 miles of inland waterways maintained by the Corps carry one sixth of the nation's inter-city cargo. Where they operate, commercial barge lines provide by far the most efficient and economical mode of transportation for bulk commodities such as coal, grain, and chemicals - goods often bound for U.S. ports for export around the world. One barge can carry about as much freight as 15 railroad cars or 60 tractor-trailers; and can move this cargo at a cost per ton-mile about half that of rail transportation or one-tenth that of trucking. The importance of the Corps mission in maintaining depths at nearly 300 deep-draft harbors (plus more than 600 smaller ports), meanwhile, is underscored by an estimated 15 million jobs - one in seven in the United States - being dependent, to some extent, on the commerce handled by these ports. The ports and waterways built, operated and maintained by the Army Civil Works program are not only vital to the nation's economy, but have direct military uses for strategic mobility. Harbor dredging maintains channels not only for commercial traffic but for naval vessels as well. Nearly every piece of equipment used in Operations DESERT SHIELD and DESERT STORM traveled to Southwest Asia through U.S. ports maintained by the Civil Works program. (At the other end of the line, much of this equipment was landed at Saudi ports designed and built by the Corps of Engineers in a cooperative development program in the 1970s and 1980s. Corps expertise in harbor clearance and development is also vital in landing troops for contingency missions in areas where transportation infrastructure is limited or nonexistent.)

### Flood Damage Reduction and Flood Plain Management

Federal interest in reducing flood damage began in the alluvial valley of the Mississippi River in the mid-19th century. As the relationship of flood damage reduction and navigation became apparent, Congress called on the Corps of Engineers to use its navigational expertise to devise solutions to flooding problems along the river. Among the early Corps projects in this arena were the levees protecting St. Louis, MO, to this day, designed in 1837 by Engineer Lieutenants Robert E. Lee and Montgomery Meigs. After a series of disastrous floods affecting wide areas in the 1920's and 1930's, Congress determined, in the Flood Control Act of 1936, that the federal government would participate in the solution of flooding problems affecting the public interest that were too large or complex to be handled by states or localities. Corps authority for flood damage reduction was thus extended to embrace the entire country. The

purpose of flood damage reduction work is to prevent damage through regulation of the flow of water and other means. Prevention of flood-related damages can be accomplished with structural measures, such as reservoirs, levees, channels and floodwalls that modify the characteristics of floods; or non-structural measures, such as flood plain evacuation, floodproofing, and floodway acquisition, that alter the way people use these areas and reduce the susceptibility of human activities to flood risk. The Corps turns most of the flood damage reduction projects it builds over to non-federal authorities for operation and maintenance once construction is completed. Corps reservoirs designed and built with a primary purpose of flood damage reduction often also provide multiple-purpose uses, such as municipal and industrial water supply, navigation, irrigation, hydroelectric power, conservation of fish and wildlife, and recreation. The Corps fights the nation's flood problems not only by constructing and maintaining structures, but also by providing detailed technical information on flood hazards. Under the Flood Plain Management Services Program, the Corps provides, on request, flood hazard information, technical assistance and planning guidance to other federal agencies, states, local governments and private citizens. Once community officials know the flood-prone areas in their communities and how often floods would likely occur, they can take necessary action to prevent or minimize damages to existing and to new buildings and facilities, such as adopting and enforcing zoning ordinances, building codes, and subdivision regulations. The Flood Plain Management Services Program provides assistance to other federal and state agencies in the same manner.

### Shore and Hurricane Protection

Corps work in shore protection began in 1930 when Congress directed the Corps to study ways to reduce erosion along U.S. seacoasts and the Great Lakes. Hurricane protection work was added to the erosion control mission in 1955, when Congress directed the Corps to conduct investigations along the Atlantic and Gulf Coasts to identify problem areas and determine the feasibility of protection. While each situation the Corps studies involves different considerations, Corps engineers always consider engineering feasibility and economic efficiency along with the environmental and social impacts. Federal participation in a shore protection project varies, depending on shore ownership, use, and type and frequency of benefits. (If there is no public use or benefit, the Corps will not recommend federal participation.) Once a shore or project is complete, non-federal interests assume responsibility for its operation and maintenance. Eighty-two federal shore protection projects along the coasts of the Atlantic, Pacific, Gulf of Mexico, and the Great Lakes protect a total of 226 miles of shoreline. Given the current budgetary policies of the Administration, it is unlikely that the Corps will propose federal commitments to shore protection projects to protect primarily recreational destinations which provide substantial income to state or local economies, or projects that involve long-term federal commitments.

## Hydropower

The Corps has played a significant role in meeting the nation's electric power generation needs by building and operating hydropower plants in connection with its large multiple-purpose dams. The Corps' involvement in hydropower generation began with the Rivers and Harbors Acts of 1890 and 1899, which required the Secretary of War and the Corps of Engineers to approve the sites and plans for all dams and to issue permits for their construction. The Rivers and Harbors Act of 1909 directed the Corps to consider various water uses, including water power, when submitting preliminary reports on potential projects. Today, the more than 20,000 megawatts of capacity at 75 Corps-operated power plants provide approximately 24 percent of the nation's hydroelectric power, or three percent of its total electric energy supply. The Corps continues to consider the potential for hydroelectric power development during the planning process for all water resources projects involving dams and reservoirs. In most instances today, it is non-federal interests who develop hydropower facilities at Corps projects without federal assistance. The Corps, however, can plan, build, and operate hydropower projects when it is impractical for non-federal interests to do so.

## Water Supply

Corps involvement in water supply dates back to 1853, when it began building the Washington Aqueduct, which provides water to the nation's capital and some of its suburbs to this day, and is still operated - along with two reservoirs and purification plants - by the Baltimore District's Washington Aqueduct Division. Elsewhere in the nation, the Water Supply Act of 1958 authorized the Corps to provide additional storage in its reservoirs for municipal and industrial water supply at the request of local interests, who must agree to pay the cost. The Corps also supplies water for irrigation, under terms of the Flood Control Act of 1944. This act provided that the Secretary of War, upon the recommendation of the Secretary of the Interior, could allow use of Corps reservoirs for irrigation, provided that users agree to repay the government for the water.

## Recreation

The Flood Control Act of 1944, the Federal Water Project Recreation Act of 1965, and language in specific project authorization acts authorize the Corps to construct, maintain, and operate public park and recreational facilities at its projects, and to permit others to build, maintain, and operate such facilities. The water areas of Corps projects are open to public use for boating, fishing, and other recreational purposes. The Corps of Engineers today is the federal government's second largest provider of outdoor recreational opportunities, exceeded in number of visits per year only by the U.S. Forest Service. The Corps operates more than 2,500 recreation areas at its lakes and other water

resource projects. More than 370 million visits per year are recorded at these sites; and the Corps estimates that 25 million citizens - one tenth of the population - visit a Corps project at least once in any given year. Many lakes managed by the Corps of Engineers, such as Lake Sidney Lanier near Atlanta or Lake Ray Roberts near Dallas, are primary recreational attractions for large metropolitan areas. For many visitors to these sites, the Corps park rangers they meet will be their only contact with the Department of the Army. State and local park authorities and private interests operate an additional 1,800 recreation areas at Corps projects.

Environmental Quality

The Corps carries out the Civil Works programs in accordance with many environmental laws, executive orders and regulations. Perhaps primary among these is the National Environmental Policy Act (NEPA) of 1969. This law requires federal agencies to study and consider the environmental impacts of their proposed actions. Consideration of the environmental impact of a Corps project begins in the early stages, and continues through design, construction, and operation of the project. The Corps must also comply with these environmental laws and regulations in conducting its regulatory programs. NEPA procedures ensure that public officials and private citizens may obtain and provide environmental information before federal agencies make decisions concerning the environment. In selecting alternative project designs, the Corps strives to choose options with minimum environmental impact. The Water Resources Development Act of 1986 authorizes the Corps to propose modifications of its existing projects - many of them built before current environmental requirements were in effect - for environmental improvement. Proposals the Corps has made under this authority range from use of dredged material to create nesting sites for waterfowl to modification of water control structures to improve downstream water quality for fish. The Water Resources Development Act of 1996 includes new authority for aquatic ecosystem restoration, expanding Corps participation to include new restoration efforts where there is no existing Corps project. People who learn their specialties in such Civil missions as natural and cultural resources, water quality, flood plain management, or toxic waste control help the Army meet its mission of compliance with more than 70 federal environmental statutes, plus numerous regulatory and state requirements. The Civil Works mission thus enables the Army to go "beyond compliance" to take a leadership role in natural resources stewardship. Civil Works expertise helped the Army develop such tools as the Environmental Compliance Assessment System (ECAS) and Integrated Training Area Management (ITAM). The Civil Works program is responsible for about half the Army's land holdings, and is familiar with balancing preservation of the natural environment with human use - a major issue facing the Army. This program is also the Army's repository for cultural resources expertise.

## Regulatory Programs

The Corps of Engineers regulates construction and other work in navigable waterways under Section 10 of the Rivers and Harbors Act of 1899, and has authority over the discharge of dredged or fill material into the "waters of the United States" - a term which includes wetlands and all other aquatic areas - under Section 404 of the Federal Water Pollution Control Act Amendments of 1972 (PL 92-500, the "Clean Water Act"). Under these laws, those who seek to carry out such work must first receive a permit from the Corps. The "Section 404" program is the principal way by which the federal government protects wetlands and other aquatic environments. The program's goal is to ensure protection of the aquatic environment while allowing for necessary economic development. The permit evaluation process includes a public notice and a public comment period. Applications for complex projects may also require a public hearing before the Corps makes a permit decision. In its evaluation of applications, the Corps is required by law to consider all factors involving the public interest. These may include economics, environmental concerns, historical values, fish and wildlife, aesthetics, flood damage prevention, land use classifications, navigation, recreation, water supply, water quality, energy needs, food production, and the general welfare of the public. The Corps of Engineers has issued a number of nationwide general permits, mostly for minor activities which have little or no environmental impact. Individual Corps districts have also issued regional permits for certain types of minor work in specific areas. Individuals who propose work that falls under one of these general or regional permits need not go through the full standard individual permit process. However, many general permit authorizations do involve substantial effort by the Corps, and often require project-specific mitigation for the activities authorized by the permit. Corps districts have also issued State Program General Permits for work in states that have comprehensive wetland protection programs. These permits allow applicants to do work for which they have received a permit under the state program. These general permits reduce delays and paperwork for applicants and allow the Corps to devote most of its resources to the more significant cases while maintaining the environmental safeguards of the Clean Water Act.

## Research and Development

The Civil Works program has, over the years, supported a very comprehensive and innovative research program encompassing a myriad of disciplines and aspects within the broad scope of the Civil Works program charter. The results of these many years of Civil Works-supported research and testing have produced excellent results which have made Civil Works projects, operations and maintenance more cost-effective, innovative and safer. The Corps operates four research laboratories, and lets contracts to universities and others for a sizeable portion of its program. The Topographic Engineering Center (TEC), at

Fort Belvoir, VA, does state of the art research in mapping and charting, to include exploring applications for satellite ground positioning systems (used to position dredges when working on navigation channels), stand-off sensing (to check underwater channel conditions), and computer/satellite based terrain analyses. Currently, TEC is generating and producing maps and supporting operations in Bosnia with route reconnaissance, construction estimates, geographic information systems, and trafficability studies. The Construction Engineering Research Laboratory (CERL), located near the University of Illinois at Champaign, IL, specializes in construction technologies, energy conservation, and environmental operations. Many hasty construction techniques for buildings, hardstands, roads, and other facilities in the Middle East were CERL products. The Cold Regions Research and Engineering Laboratory (CRREL), in Hanover, NH, studies the effects of low temperatures on materials, equipment, and engineer operations. This includes research on the effects of cold weather on tactical engineering. CRREL is providing cold weather construction and operation techniques for the Bosnia operation. The Waterways Experiment Station (WES) is located in Vicksburg, Miss. As its name suggests, it specializes in water systems, but it also conducts research in soil and rock mechanics, earthquake engineering, coastal engineering, and weapons effects on structures. Civil Works research and development provides the Corps, the Army, and the nation with innovative engineering products that have military and civilian applications. By creating products that improve the efficiency and competitiveness of the nation's engineering and construction industry and providing more cost-effective ways to operate and maintain infrastructure, Civil Works research and development contributes to the National Security Strategy objective to promote prosperity. The military applications of this work contribute to the "enhance security" objective. In addition, Corps laboratories host hundreds of foreign visitors and engage in numerous joint international research projects. The contacts developed in this work support the National Security Strategy objective to promote democracy.

Inter-Agency and International Assistance

The Corps of Engineers provides engineering support to 60 non-DoD federal agencies, states, local and tribal governments, other nations and international organizations. Customers often find that their construction programs can be more effectively managed with Corps expertise than by their own personnel. Corps support to international customers provides the added benefit of promoting democracy and reducing the potential for conflict in other nations. Funds for inter-agency and international assistance are provided by the customer being served by the Corps. Corps support of other agency infrastructure programs includes designing and constructing facilities for the Departments of Energy and Interior and the Drug Enforcement Agency. The Corps also supports other federal agencies in meeting important environmental

objectives, such as Environmental Protection Agency Superfund and Department of Energy cleanup at nuclear production facilities.

Emergency Response and Recovery

Throughout the nation's history, citizens have relied on the Army to respond to their needs in disasters. In a typical year, the Corps of Engineers responds to more than 30 Presidential Disaster Declarations, plus numerous state and local emergencies. Emergency responses usually involve cooperation with other military elements (coordinated by the Director of Military Support) and federal agencies in support of state and local efforts. Corps of Engineers engineering and contracting efforts, however, often mean that troop units called on for emergency support can be returned to training sooner than would otherwise be possible. The Corps provides emergency response to natural disasters under Public Law 84-99, which covers flood control and coastal emergencies. It also provides emergency support to other agencies, particularly the Federal Emergency Management Agency (FEMA), under Public Law 93-288 (the Stafford Act) as amended. Under P.L. 84-99, the Chief of Engineers, acting for the Secretary of the Army, is authorized to carry out disaster preparedness work, advance measures, emergency operations such as flood fighting, rescue and emergency relief activities, rehabilitation of flood control works threatened or destroyed by flood, and protection or repair of federally authorized shore protection works threatened or damaged by coastal storms. This act also authorizes the Corps to provide emergency supplies of clean water in cases of drought or contaminated water supply. After the immediate flooding has passed, the Corps provides temporary construction and repairs to essential public utilities and facilities and emergency access for a 10-day period, at the request of the governor and prior to a Presidential Disaster Declaration. Under the Stafford Act and the Federal Response Plan, the Corps of Engineers, as designated by the Department of Defense, is responsible for providing public works and engineering support in response to a major disaster or catastrophic earthquake. Under this plan, the Corps, in coordination with FEMA, will work directly with state authorities in providing temporary repair and construction of roads, bridges, and utilities, temporary shelter, debris removal and demolition, water supply, etc. The Corps is the lead federal agency tasked by FEMA to provide engineering, design, construction, and contract management in support of recovery operations.

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